Patent claims

1.

A method for recovering peptides/amino acids and oil/fat from one or more protein-containing raw materials characterised in that it comprises the following steps:

a. grinding the raw materials;
b. heating the ground raw materials to a temperature in the range of 40-62°C, preferably 45-58°C;
c. optionally before and/or after the heating step, separating oil/fat from the raw materials in order to obtain a first oil product;
d. adding water, the water having approximately the same or the same temperature as the raw materials, and wherein the pH of the water is adjusted by adding calcium;
e. hydrolysing the raw materials with endogenous enzymes in order to prepare a hydrolysate:
f. optionally during the hydrolysation step, adding a pH adjuster in order to maintain the desired pH value of the hydrolysate;
g. heating the hydrolysate to 75-100°C, preferably 85-95°C;
h. removing large particles from the hydrolysate, including non-hydrolysed proteins, which can be returned to the hydrolysis;
i. optionally separating off fat/oil in order to obtain a second oil product;
j. coagulating the proteins;
k. removing the coagulated proteins;
l. optionally separating off fat/oil in order to obtain a third oil product;
m. optionally concentrating the remaining amino acids and short peptides; and
n. optionally drying the concentrate in order to obtain dry short peptides and amino acids.

2.

A method according to claim 1, characterised in that the wa dded in step d comprises 10-40%, preferably 20-30% water of a total reaction mixture.

3.

A method according to claim 1, characterised in that it takes place as a closed process.

4.
A method according to claim 1, characterised in that the pH adjuster in step f is nitrogen gas, calcium or bone meal.

5. 5.
A method according to claim 1, characterised in that it further comprises dividing the large particles from step h into bone portions for producing hydroxy apatite, protein residues that can be returned to the hydrolysis, and other solid particles.

10 6.
A method according to claim 1, characterised in that the peptide and amino acid product has a fat content of < 0.1% and a salt content of < 1%.

7.
15 The use of one of the methods according to claim 1 for producing a pharmaceutical product.

8.
The use of one of the methods according to claim 1 for producing a food product.

20

9.
The use of one of the methods according to claim 1 for producing a feed product.

10.
25 The use of one of the methods according to claim 1 for producing a biotechnological product.

11.
The use of the method according to claim 1 for producing hydroxy apatite.

30

12.
Amino acids/peptides prepared by the method of claim 1, characterised in that they do not contain allergens and DNA traces, and that the fat content is < 0.1% and they have a salt content of < 0.5% by weight.

35

13.

Hydroxy apatite produced by the method of claim 5, characterised in that it does not contain allergens and DNA traces.

14.

Oil, characterised in that it is the first oil product produced by the method of claim 1, is cold-pressed and is of foodstuff quality.

15.

A method for recovering peptides/amino acids from one or more protein-containing raw products, characterised in that it comprises the following steps:

a. grinding the raw materials;
b. heating the ground raw materials to temperatures in the range of 40 to 62°C, preferably 45 to 58°C;
c. optionally before and/or after the heating step, separating oil/fat from the raw materials in order to obtain a first oil product;
d. adding water, the water having approximately the same or the same temperature as the raw materials, and wherein the pH of the water is adjusted by adding calcium;
e. hydrolysing the raw materials with endogenous enzymes in order to prepare a hydrolysate;
f. optionally during the hydrolysation step, adding a pH adjuster in order to maintain the desired pH value of the hydrolysate;
g. heating the hydrolysate to 75-100°C, preferably 85-95°C;
h. removing large particles from the hydrolysate including non-hydrolysed proteins;
i. optionally separating off fat/oil in order to obtain a second oil product;
j. removing the proteins and long peptides;
k. concentrating the remaining amino acids and peptides;
l. returning proteins and long peptides to the concentrate in order to obtain a protein product; and
m. optionally drying the protein product in order to obtain a dried product containing proteins, free amino acids and short and long peptides.

16.

A method according to claim 15, characterised in that the water added in step d comprises 10-40%, preferably 20-30% water of a total reaction mixture.

17.
A method according to claim 15, characterised in that it takes place as a closed process.

18.
A method according to claim 15, characterised in that the pH adjuster in step f is nitrogen gas, calcium or bone meal.

19.
A method according to claim 15, characterised in that it further comprises dividing the large particles from step h into bone portions for producing hydroxy apatite, protein residues and other solid particles.

20.
A method according to one of claims 15-19, characterised in that the protein product comprises 5-95% by weight of free amino acids, preferably 30-60% by weight.

21.
A method according to one of claims 15-20, characterised in that the protein product contains less than 0.5% by weight of fat

22.
A method according to one of claims 15-21, characterised in that the protein product contains less than 1% by weight of salt.

23.
The use of one of the methods according to claim 15 for producing a veterinary medical product.

24.
The use of one of the methods according to claim 15 for producing a food product.

25.
The use of one of the methods according to claim 15 for producing a feed product.

26.

Oil, characterised in that it is the first oil product produced by the method of claim 15, is cold-pressed and is of foodstuff quality.

27.

A method for recovering peptides/amino acids and oil/fat from a protein-containing raw material, characterised in that it comprises the following steps:

a. grinding the raw materials;
b. heating the ground raw materials to temperatures in the range of 40-62°C, preferably 45-58°C;
c. optionally before and/or after the heating step, separating oil/fat from the raw materials in order to obtain a first oil product;
d. adding water which has approximately the same or the same temperature as the raw materials, and wherein the pH of the water is adjusted by adding calcium;
e. hydrolysing the raw materials with endogenous enzymes in order to prepare a hydrolysate;
f. optionally during the hydrolysation step, adding a pH adjuster in order to maintain the desired pH value of the hydrolysate;
g. removing solid particles and non-hydrolysed proteins which can be returned to the hydrolysis from the hydrolysate;
h. periodically or continually separating off fat/oil in order to obtain a second oil product;
i. optionally treating the hydrolysate against microorganism growth, preferably with UV treatment;
j. separating off the molecular weight fraction of peptides/amino acids desired by membrane filtration, preferably of crossflow type;
k. routing the portions of the hydrolysate that do not penetrate the membrane filter in point j back to the hydrolysis in step e;
l. concentrating and optionally drying the permeate in order to obtain peptides/amino acids; and
m. wholly or partly returning the distillate from the concentration to the permeate side of the membrane filter.

28.

A method according to claim 27, characterised in that it takes place as a closed process.

29.
A method according to claim 27, characterised in that the pH adjuster in step f is nitrogen gas or bone meal.

30.
A method according to claim 27, characterised in that it further comprises dividing the solid particles from step g into hydroxy apatite, protein residues and other solid particles.

31.
A method according to claim 27, characterised in that the second oil product recovered in step h is passed through a filter, and any heavy portions (e.g., stearic acid) are removed in order to obtain a cold-pressed, protein-free sterile oil.

32.
A method for the hydrolysation of one or more protein-containing raw materials and the separation of amino acids/peptide, characterised in
that the hydrolysation is carried out using the endogenous enzymes of the protein-containing material or materials; and
that the hydrolysate is passed through a membrane-like filter, wherein peptides/amino acids follow a permeate stream, whilst the active enzymes continuously break down any protein residues that are deposited on the membrane surface and the enzymes are passed together with the retenate back to the hydrolysis.

33.
A method for removing peptides and amino acids from a hydrolysis mixture, characterised in that the hydrolysis mixture comprising active enzymes, amino acids, peptides and non-converted proteins is passed through a membrane filter, wherein amino acids and any peptides are filtered off and the active enzymes present act to break down proteins that are deposited on the membrane filter.

34.
The use of one of the methods according to claim 27, 32 or 33 for producing a pharmaceutical product.

35.
The use of one of the methods according to claim 27, 32 or 33 for producing a biotechnological product.

36.
The use of one of the methods according to claim 27, 32 or 33 for producing a food product.

37.
The use of one of the methods according to claim 27, 32 or 33 for producing a feed product.

38.
The use of the method according to claim 30 for producing hydroxy apatite.

39.
Amino acids/peptides produced by the method according to claim 27, characterised in that they do not contain allergens and DNA traces, are virtually fat-free and have a salt content of $< 0.5\%$ by weight.

40.
Oil produced by the method according to claim 31, characterised in that it does not contain allergens or DNA traces.

41.
Hydroxy apatite produced by the method according to claim 30, characterised in that it does not contain allergens or DNA traces.